Preliminary Results on Jet Energy correction using Tracker

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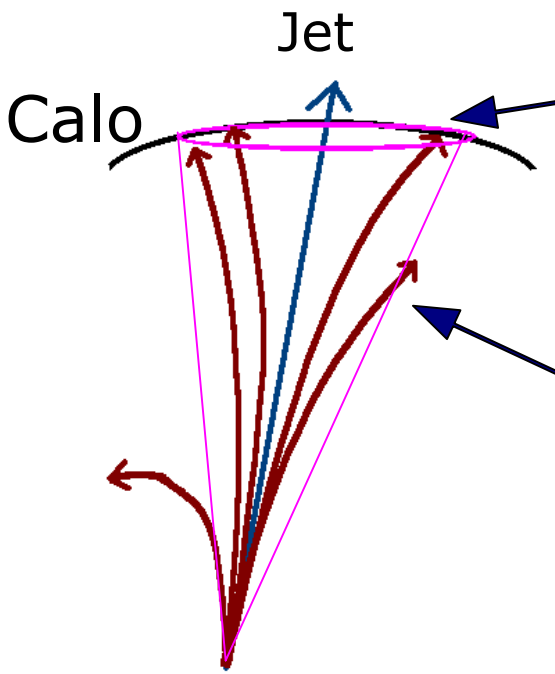
The Idea:



Tracker P_T measurement replaces Calorimetric one (estimated with e/pi technique) for track inside jet cone

If tracks are soft the tracker measurement is “simply” added

JetPlusTracks.cc

A class exists thanks to Olga:

My_jet JetPlusTracks::correct(My_Jet&,
Vector<EcalPlusHcalTower>&, RecCollection<TTrack>&)

How the method works

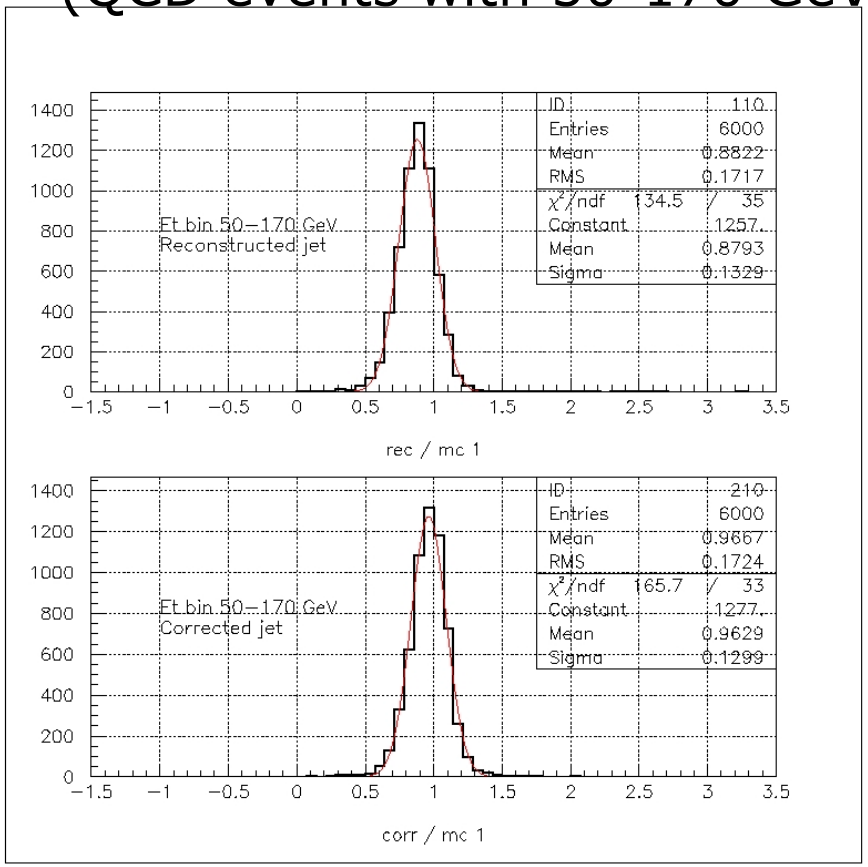
loop on tracks:

- check if track reconstruction is good
- propagate track in the calorimeter
- calculate track momentum
- if interact with calo check if track is inside or outside the jet cone
- if inside subtract expected responce (e/pi) and add track momentum measurement
- if outside just add the tracker measurement

Some preliminary result

The class is now tested on multi jets events only for tracks inside the jet cone

(QCD events with 50-170 GeV P_T-hat)



Calorimeter only

$E_{T(calo)} / E_{T(MC)} = 0.88$

($\sigma_{E/EMC} \sim 0.13$)

Calorimeter + Tracker

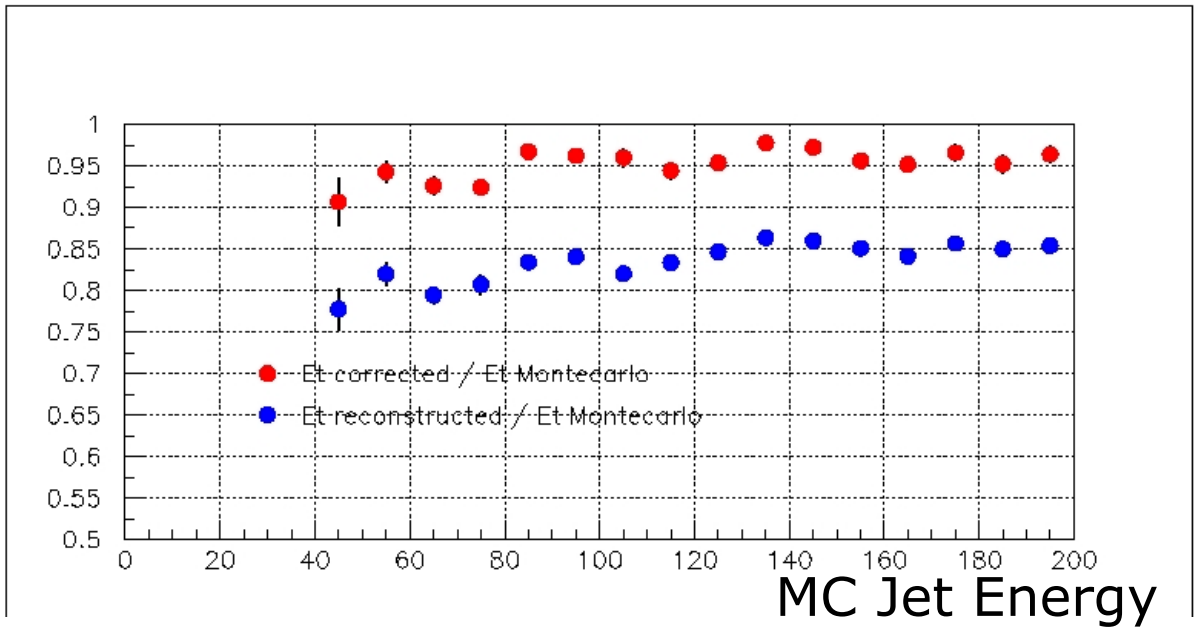
$E_{T(calo+tracker)} / E_{T(MC)} = 0.96$

($\sigma_{E/EMC} \sim 0.13$)

Jets are reconstructed with cone algorithm (0.4)

Some preliminary result

The correction "stability"



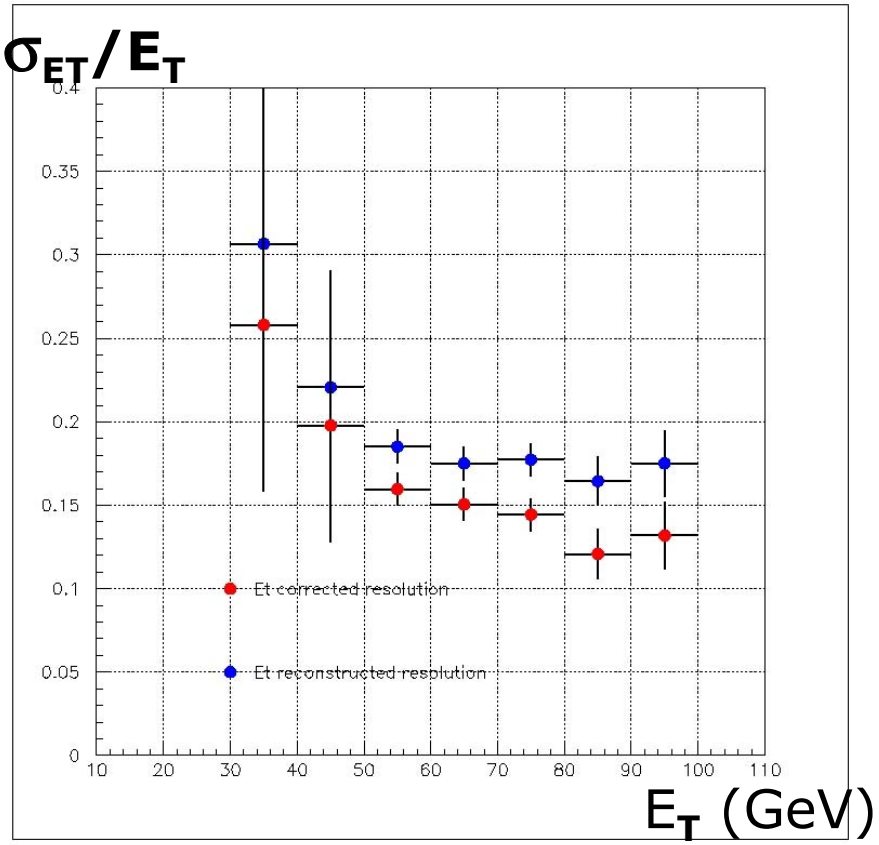
$E_{T(calo+tracker)} / E_{T(MC)}$

$E_{T(calo)} / E_{T(MC)}$

The effect of correction is stable in 40 – 200 GeV E_T interval

Some preliminary result

Resolution



Low ET interval (40 – 80)

The gain in resolution is between 15% and 30%

Only Calo E_T resolution

Calo + Tracker E_T resolution

The Partial Track Reconstruction

An update of PartialTrackFinder.cc (now there is only a stop condition on the hit number for track reconstruction) is in progress:

There are 3 main reconstruction methods:

::GlobalReco()

all tracks are reconstructed in the event

::RegionalReco(double& etajet, double& phijet, double& deltaR)

only tracks in the R.o.I. ΔR around jet direction are reconstructed

::PartialReco(double& etajet, double& phijet, double& deltaR)

tracks are reconstructed starting from a seed of pixel line selected in a R.o.I. ΔR around the jet direction

The idea is to have a more general interface as possible that give the same object as result: vector<RecTrack>

Next…

- More test are needed using full track reconstruction (soft tracks effect, different samples…)

- Implement the new PartialTrackFinder

  Is possible to check the partial track reconstruction effect using the modified JetPlusTracks.cc (second correction method) in:

/afs/cern.ch/user/l/liviof/public/sasha/JetPlusTracks.cc

- Test the effect on some physics channel (main interest on soft jets final state)